

What we claim is:

- 09173120-101598
1. A method of fabricating an electrical device formed in a semiconductor substrate, said method comprising:
- forming an insulating layer over said semiconductor substrate;
 - forming a silicon-containing structure on said insulating layer;
 - forming a conductive structure on said silicon-containing structure; and
 - oxidizing a portion of said insulating layer and said silicon-containing structure while leaving said conductive structure substantially unoxidized by introducing an oxygen-containing gas and a separate hydrogen containing gas to said insulating layer, said silicon-containing structure and said conductive structure.
2. The method of claim 1, wherein said electrical device is selected from the group consisting of: a memory device, a capacitor, a transistor, a logic device, a digital signal processor, a microprocessor, and any combination thereof.
3. The method of claim 1, wherein said oxygen-containing gas is comprised of a gas selected from the group consisting of: O_2 , N_2O , CO_2 , H_2O , and any combination thereof.
4. The method of claim 1, wherein said hydrogen-containing gas is comprised of H_2 or deuterium.
5. The method of claim 1, wherein said insulating layer is comprised of silicon oxide.
6. The method of claim 1, wherein said silicon-containing structure is comprised of a material consisting of: single crystal silicon, doped polycrystalline silicon, undoped polycrystalline silicon, and amorphous silicon.
7. The method of claim 1, wherein said conductive structure is comprised of an oxygen-sensitive material.

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8. The method of claim 1, wherein said conductive structure is comprised of a material selected from the group consisting of: tungsten, copper, and any combination thereof.
9. A method of oxidizing a first feature while leaving a second feature substantially unoxidized, said method comprised of subjecting said first and second features to an oxygen-containing gas and a separate hydrogen-containing gas.
10. The method of claim 9, wherein said oxygen-containing gas is comprised of a gas selected from the group consisting of: O_2 , N_2O , CO_2 , H_2O , and any combination thereof.
11. The method of claim 9, wherein said hydrogen-containing gas is comprised of H_2 .
12. The method of claim 9, wherein said first feature is comprised of polycrystalline silicon.
13. The method of claim 9, wherein said first feature is comprised of silicon oxide.
14. The method of claim 9, wherein said first feature is comprised of a dielectric material.
15. The method of claim 9, wherein said second feature is comprised of tungsten.
16. A method of fabricating a capacitor having a dielectric between a bottom electrode and a top electrode and situated over a semiconductor substrate, said method comprising the steps of:
- providing said bottom electrode over said semiconductor substrate;
 - providing a dielectric material over said bottom electrode; and
 - subjecting said bottom electrode and said dielectric material to an oxygen-containing gas and a separate hydrogen-containing gas, wherein said dielectric material is oxidized and said bottom electrode remains substantially unoxidized.
17. The method of claim 16, wherein said oxygen-containing gas is comprised of a gas selected from the group consisting of: O_2 , N_2O , CO_2 , H_2O , and any combination thereof.

18. The method of claim 16, wherein said hydrogen-containing gas is comprised of H₂.

19. The method of claim 16, wherein said dielectric material is comprised of a material selected from the group consisting of: an oxide/nitride stack, BST, tantalum pentoxide, PZT, and any combination thereof.

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Q3 dielectric material is oxidized and said bottom electrode remains substantially unoxidized.

Please add the following claims:

Sub B41 -- 20 (New). The method of claim 1 wherein said oxidizing step comprises the step of oxidizing a portion of said insulating layer and said silicon-containing structure while leaving said conductive structure substantially unoxidized by introducing O₂ and H₂ in a portion of a process chamber's total volume. --

Q4 -- 21 (New). The method of claim 1 wherein said oxidizing step comprises the step of oxidizing a portion of said insulating layer and said silicon-containing structure while leaving said conductive structure substantially unoxidized by introducing O₂ and H₂ in a predetermined ratio and increasing the concentration of one of said O₂ or H₂ after a reaction begins. --

Sub B47 -- 22 (New). The method of claim 9 and further comprising the step of introducing O₂ and H₂ in a portion of a process chamber's total volume. --

-- 23 (New) The method of claim 9 and further comprising the step of introducing O₂ and H₂ in a predetermined ratio and increasing the concentration of one of said O₂ or H₂ after a reaction begins. --

Sub B47 -- 24 (New). The method of claim 16 and further comprising the step of introducing O₂ and H₂ in a portion of a process chamber's total volume. --

-- 25 (New) The method of claim 16 and further comprising the step of introducing O₂ and H₂ in a predetermined ratio and increasing the concentration of one of said O₂ or H₂ after a reaction begins. --

✓ -- 26 (New). A method of fabricating an electrical device formed in a semiconductor substrate, said method comprising:

forming an insulating layer over said semiconductor substrate;

forming a silicon-containing structure on said insulating layer;

forming a conductive structure on said silicon-containing structure; and

oxidizing a portion of said insulating layer and said silicon-containing structure while leaving said conductive structure substantially unoxidized by introducing an oxygen-containing gas selected from the group consisting of O₂, N₂O, CO₂ and a separate hydrogen-containing gas to said insulating layer, said silicon-containing structure and said conductive structure.--

✓ -- 27 (New). The method of claim 26 wherein said oxidizing step comprises the step of oxidizing a portion of said insulating layer and said silicon-containing structure while leaving said conductive structure substantially unoxidized by introducing said oxygen-containing gas and said hydrogen containing gas in a portion of a process chamber's total volume. --

-- 28 (New). The method of claim 26 wherein said oxidizing step comprises the step of oxidizing a portion of said insulating layer and said silicon-containing structure while leaving said conductive structure substantially unoxidized by introducing oxygen-containing gas and said hydrogen containing gas in a first